

XIV. *Description of the Asafœtida Plant of Central Asia.* By HUGH FALCONER, M.D., F.L.S. &c.

Read November 3rd, 1846.

Ord. Nat. UMBELLIFERÆ.

Trib. PEUCEDANEÆ, DeC.

NARTHEX.

CHAR. GEN. *Calycis* margo obsoletus. *Petala* —? *Stylopodium* plicato-urceolatum. *Styli* filiformes demùm reflexi. *Fructus* a dorso plano-compressus, margine dilatato cinctus. *Mericarpia* jugis primariis 5, 3 intermediis filiformibus, 2 lateralibus obsoletioribus margini contiguus immersis. *Vittæ* in valleculis dorsalibus plerumque solitariae (valleculis lateralibus nunc sesqui- vel bivittatis); commissurales 4–6 variæ inæquales, exterioribus sæpè reticulatim interruptis. *Semen* complanatum. *Carpophorum* bipartitum. *Umbellæ* pedunculatæ, compositæ. *Involucrum* utrumque nullum.

Genus inter *Peucedaneas*, calycis margine edentato, fructûs vittis magnis, commissuralibusque inæqualibus, et involucro utroque nullo, distinctum. *Narthen* nuncupatum a vocabulo *νάρθηξ*, apud Dioscoridem *Ferulæ* attributo.

N. ASAFÆTIDA, caule tereti simplici petiolis dilatatis aphyllis instructo, foliis radicalibus fasciculatis; petiolis trisectis segmentis bipinnatisectis: laciniis lineari-lingulatis obtusis inæquilateralibus integris vel variè sinuatis decurrentibus.

Asafætida Disgunensis, Kæmpf. Amœnit. Exot. p. 535.

Ferula Asafætida, Linn. Mater. Med. p. 79; DeCand. Prodr. iv. 173; Lindl. Flor. Med. p. 45.

Hab. in apricis inter saxa in valle “Astore” vel “Hussorah” dictâ prope Indum, ultra Cashmeer; indigenis Daradris “Sip” vel “Süp.” Legi fructigerum prope Boosthôn 21° die Septembris 1838.

DESCR. A tall perennial plant, 5 to 8 feet high. Root fusiform, simple or divided, a foot or upwards in length, about 3 inches in diameter at the top, with a dark-greyish transversely corrugated surface: the summit invested above the soil with dark hair-like fibrous tegmenta, the persistent exuviæ of former years: cortical layer thick and

tough, white or ash-coloured in the section, readily separable from the central core, and like the latter abounding in a white, milky, opaque, excessively foetid, alliaceous juice. Leaves collected into a fascicle above the root, numerous, large and spreading, about 18 inches in length in the adult plant, of a light-green colour above, paler underneath, and of a dry leathery texture: the petioles terete, amplexicaul and channelled at the base, trifurcated a little above it, the divisions emitted at an angle with each other like the legs of a tripod and bipinnately sected: the leaf-segments linear-lingulate, more or less obtuse, entire or sinuately lobed, variable in their offset, being either alternate or opposite, for the most part unequal-sided, and decurrent along the divisions of the petiole, forming a narrow winged channel upon the latter. Midrib prominent on the under side; veins slender and anastomosing by numerous reticulations. The leaves observed on a young growing plant were about 9 inches in length, the leaf-segments being from 2 to 4 inches long by 4 to 6 lines in width. Stem erect, terete, simple, striated, about 2 inches in diameter at the base, solid throughout, the spongy medulla being traversed by scattered, tough, fibrous bundles of vessels; invested with alternate, vaginating, dilated aphyllous petioles, and terminating in a luxuriant head of compound umbels. General as well as partial involucra entirely wanting. Umbels 10- to 20-rayed, emitted from the dilated spherical head of a common peduncle, the rays 2-4 inches in length. Partial umbels with very short rays aggregated into round capitula varying from 10 to 20 rays in the fertile, and from 25 to 30 in the barren umbellulæ. Flowers small; barren generally mixed up with the fertile flowers (?). Border of the calyx obsolete, being reduced to very minute denticular points. (Petals in the barren flowers small, oblique, unequal-sided, acute, without an elongated acumen (?).) Stylopodia urceolate and plicated, with a sinuous margin. Styles filiform, reflected on the ripe fruit, rather short and slender, attached by a broad base. Fruit: from 7 to 15 ripening on the partial umbels, supported on short stalks. Mericarps varying from broad elliptical to elliptical obovate, 5-6 lines long by 3 to 4 lines broad, flat, thin, foliaceous, but somewhat convex in the middle, with a dilated border, generally unequal-sided, of a dark reddish brown towards the centre, lighter towards the margin, perfectly smooth, with somewhat of a glossy surface. Dorsal primary ridges 5; the 3 middle ridges filiform, slightly crested towards their confluence at the apex; the lateral ridges more obsolete, situated close to the margin, immersed in the substance of the border, but distinctly seen on the surface of the commissure, and confluent with the middle nerve of the latter. The dilated borders as wide as the space occupied by the three middle ridges. Vittæ in the dorsal furrows large and broad, occupying the entire width of the valliculæ, stretching from base to apex, usually solitary, but sometimes double in one or other of the middle furrows, and generally double or dichotomous with a small branch in the broadest side of the margin, turgid with a foetid

juice: vittæ of the commissure ranging from 4 to 6, very unequal and variable: one very slender vitta, which is frequently dichotomous in two fine threads confluent at the apex, being placed close on either side of the middle nerve; another of the size of the dorsal vittæ situated more outwards, and a third at the inner side of the dilated border, over the edge of the seed, more slender, but frequently subdivided and interrupted so as to cover the border with a beautiful network of anastomosing ramifications. Seed flattened, with plane albumen. Carpophores bipartite, persistent, twice the length of the pedicels. Flowers white?

The plant above described I believe to be the true "*Asafoetida Disgunensis*" or "*Hingisch*" of Kæmpfer. It does not appear to have been met with by any other botanist since it was examined *in situ* by that excellent and careful observer upwards of a century and a half ago.

I have compared my materials with Kæmpfer's description and figures (Amœn. Exot. p. 537), and with his original specimens contained in the collection in the British Museum, and found them, so far as a comparison could be instituted, to agree in every essential respect. The leaves, "instar *Pæoniæ ramosa*," as represented in his figures, have the segments more obtuse and sinuated, and more alternate in their offset than they are represented in my drawing; but he describes them as being very variable in form, and some of the numerous leaf-specimens in his herbarium correspond with the figures which I have given. Kæmpfer mentions the umbellulæ as having only 5 or 6 rays, whereas I found them as numerous as 25 or 30 in the sterile capitula, and from 10 to 20 in the fertile ones. But he states that he never saw the plant in flower, and his description was probably drawn from the ripe state, in which the partial umbels occasionally present no more than 7 fruit-bearing stalks. There are two mericarps in his herbarium, agreeing exactly in form and in the development of the dorsal juga with those met with by me in the Astore plant: but Kæmpfer's specimens are glued down on paper, and they seem to have undergone some decay or alteration by which the vittæ have been emptied, so that their number and size cannot be distinctly made out. But they appear to be solitary in the dorsal valliculæ, and there is no indication of the numerous striæ represented in the figures of the fruit given in the 'Amœnitates,' which may have confirmed authors in the belief that Kæmpfer's *Asafoetida* plant belonged to a species of *Ferula*. These mericarps are perfectly

smooth, and exhibit nothing of the “quadramtenus pilosum sive asperum” described in the ‘*Ainœnitates*,’ p. 538. Dr. Lindley in his ‘*Flora Medica*,’ p. 45, after an abridgement of Kæmpfer’s description, states, it is not mentioned upon what evidence, the vittæ of the back to be “about 20 or 22, interrupted, anastomosing, and turgid with *Asafœtida*; of the commissure 10.” This account will apply to the fruit of a species of *Ferula*, but is entirely at variance with the characters presented by the fruits of the plants observed by Kæmpfer in Persia, and by myself in Astore.

Kæmpfer in his description says: “*Folia serò autumno ex vertice progerminant, sex, septem, et pro radicis magnitudine plura vel pauciora: quæ per brumam luxuriosè vigent adultoque vere exarescunt.*” From the information which I gathered on the spot, confirmed by subsequent observation upon the growing plants introduced into the Botanic Garden at Saharunpoor, the leaves of the Astore *Asafœtida* plant make their appearance in spring, and not in autumn surviving through the winter, as stated by Kæmpfer respecting the Persian form. With these slight discrepancies, his description might serve for the Astore plant.

Narthex, both in the characters of the flower and fruit, and in its “pæony-leaved” habit, differs widely from any known species of *Ferula*, and appears to constitute a well-marked genus distinct from any hitherto described. I have not been able to find it described in Boissier’s ‘*Diagnoses Plantarum Orientalium*,’ and it does not occur among the sets of Persian *Umbellifera* from Aucher-Eloy’s collection in the British Museum, or in the herbarium of Sir W. Hooker, although that traveller appears to have collected in or near the *Asafœtida* region.

I met with the plant growing wild in the valley of Astore, one of the subordinate valleys of the Indus behind Cashmeer, about the middle of September 1838, when returning from an exploratory journey into the Thibetan region of Central Asia. On showing the specimens to Jubbar Khan, the Dardoh Rajah of the country, he at once named it as the plant which yields the “Heeng,” or *Asafœtida* of commerce. In the Dardoh or Dangree language (the Dardohs being the Daradri of Arrian), the plant is called “Sip” or “Süp;” and the young shoots of the stem in spring are highly prized as an excellent and delicate vegetable. Jubbar Khan was well-versed in the Per-

sian language, and referred to the medicinal accounts of the plant given by the Persian and Arabic authors. The Dardohs, who are a wild and rude race, do not collect the gum-resin for exportation. The plant does not occur in great abundance in Astore, which appears to be the extreme point of the north-eastern range of the species. At different elevations of the same valley, or its branches, I found *Prangos pabularia*, two species of *Pyrola*, *Pinus Gerardiana*, together with species of *Bupleurum*, *Statice*, *Ribes*, *Podophyllum*, *Epipactis*, *Sambucus*, &c.

Like Kæmpfer, I have never seen the plant in flower; when I met with it, it was dried up and in ripe fruit, the leaves withered, and the stems damaged by cattle. I secured a quantity of the fruit-bearing umbels, and the withered stalks and leaves, among which there were some partial umbels of barren flowers with an occasional petal remaining. The account of the petals is in consequence given in the description with doubt. Some young roots were carefully removed and introduced, in the first instance into the Botanic Garden at Saharunpoor, and afterwards transferred to the subsidiary Hill Garden at the Himalayan Station of Mussooree. Some of these roots succeeded well, without however flowering, up to the period when I left India; one of them having furnished a small quantity of Asafœtida, which differed in no respect from the ordinary condition of the gum-resin as it occurs in commerce. This circumstance is mentioned in Dr. Royle's 'Productive Resources of India,' p. 223. These materials combined have furnished the description given above. I left a commission with Ahud Meerza, a native friend in Cashmeer, to procure for me the following season from Astore specimens of the plant in flower; this he was unable to accomplish, but he forwarded to me a large quantity of fresh seeds from the same locality, which reached me in December 1839, and were transmitted to the India House, whence they were distributed to several gardens by Dr. Royle. Some of these seeds, I have been informed, have been grown in the Botanical Garden at Edinburgh.

The evidence here adduced I believe to be conclusive as to the true plant which produces the "Heeng," or Asafœtida of commerce, the "Laser" of Pliny as distinguished from the ὀπὸς Κυρηναϊκὸς of the Greeks from Cyrene. The species would appear to occur in the greatest abundance in the provinces of Khorassan and Laar in Persia, and thence to extend, on the one hand, into

the plains of Toorkistan upon the Oxus, north of the Hindoo Koosh mountains, where it seems to have been met with by Sir Alexander Burnes* ; and on the other, to stretch across from Beloochistan, through Candahar and other provinces of Affghanistan, to the eastern side of the valley of the Indus, where it stops in Astore, and does not occur in great abundance. The whole of this region, which constitutes the head-quarters of the gum-bearing *Umbelliferae*, possesses the common character of an excessively dry climate, indicated in Berghaus's Hygrometric map in Johnstone's 'Physical Atlas' by a belt of white. According to my observation, it does not extend into Cashmeer, although *Prangos pabularia*, which is associated with it in Astore, grows abundantly in that valley.

Besides the gum-resin, the fruit of *Narthex Asafœtida* is imported into India from Persia and Affghanistan, under the name of "Anjoodan," being extensively employed by the native physicians in India; Anjoodan being the epithet applied to the seed of the "Heengseh," or "Hulteet," by Avicenna, also quoted by Kæmpfer, and used by the Indo-Persian and Arabic writers generally in describing the *Asafœtida* plant. Another umbelliferous fruit is also imported with it, and sold under the name of "Doogoo," (a word evidently connected with the *δαῦκος* of the Greeks,) being recommended as an excellent substitute for "Anjoodan," which it closely resembles in its general appearance. This I found to be the fruit of a species of true *Ferula*; it is one of the two *Asafœtida*-like fruits mentioned by Dr. Royle as occurring in the bazaars of northern India, and may be that which furnished the account which Dr. Lindley, in the passage above quoted, has mixed up with his description of the *Asafœtida* plant of Kæmpfer. The following are the characters of this "Doogoo" seed, extracted from a description of bazaar specimens drawn up by me in the north of India:—"Mericarps broad elliptical or elliptical-obovate, somewhat convex in the middle, thin, with a dilated border, $3\frac{1}{2}$ to 5 lines long by $2\frac{1}{2}$ to 3 lines broad. Dorsal ridges 3, filiform, but slightly elevated, the lateral ridges less apparent, giving a thickened edge to the border. Dorsal vittæ about 4 in each channel, interrupted, branched and

* Burnes mentions the plant as an annual, probably in consequence of the annual decay of the stems. He states that sheep browse on the young shoots, which are considered to be very nutritious.—*Trav.* vol. ii. p. 243.

anastomosing; commissural vittæ about 10, more apart than those of the dorsum, the whole fruit turgid with milky juice, having a fœtid alliaceous odour resembling *Asafœtida*." The species of *Ferula* yielding this fruit may furnish some one of the obscurely-known gum-resins resembling *Asafœtida* produced in Persia: the observed odour in this instance is not conclusive, as the "Doo-qoo" seed is imported from Affghanistan in the same packages with *Asafœtida*, the rank fœtor of which (hence quoted, among other synonyms, by Kæmpfer as a translation from the German, under the name of "*Stercus Diaboli*,") kills every less potent odour, and adheres with great tenacity to all light and spongy medicinal substances.

I have examined another kind of umbelliferous fruit in the collection of Dr. Royle, labelled as "the seed of the wild *Asafœtida* plant, collected and brought to England by Sir J. Macneill from Persia," which differs widely from the fruit both of *Nartherx* and of *Ferula*, and belongs to another tribe of the order.

Having had no opportunity of observing the manner in which *Asafœtida* is procured from the roots of *Nartherx*, I have nothing to remark upon the excellent and very copious account of the process given by Kæmpfer, which bears the strongest character of careful observation and fidelity of record. The small sample which I got at Saharunpoor was exuded from the top of the root without an incision.